[redacted] STAT

May 13, 1960

Brig. Gen. Don Flickinger, USAF (MC)
Headquarters, ARDC
Andrews Air Force Base
Washington 25, D. C.

Dear General Flickinger:

Here is some material for the psychological part of your talk in California. I hope it is the kind of thing you had in mind.

Because of the diversity of your audience and the large area to cover, I've tried to boil each section down to a few points which can be established without long explanations. It's all in outline form, so that topic headings can be placed on slides. The material which follows each heading provides a commentary on the slide.

If you want more detail on any of these points, I'll be happy to supply it. The enclosed reprints may also contain information you might like to use.

Thanks again for the trip to Mexico City. I enjoyed every minute of it--both the meeting and the partying. I hope we get together again in the near future.

Good luck with your talk.

Sincerely,

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USAF review(s) completed.

I. Psychological problems in space flight include:

A. Behavioral aspects of physiological stress affecting the central nervous system.

1. This may be caused by:

a. Acceleration

b. Heat

c. Interference with food or oxygen supply or with carbon dioxide or waste disposal

d. Radiation

e. Noise and vibration

2. It is minimized by:

a. Planning the vehicle and mission to keep stress levels as low as possible.

b. Careful selection of crew members with demonstrated ability to withstand stress.

c. Training and conditioning to improve stress tolerance.

B. Emotional reactions to realistic or symbolic aspects of the space mission.

1. These may arise from:

a. Prolonged exposure to danger.

b. Isolation

c. Life in an artifical environment.

2. They are minimized by:

a. Encouraging group identification - Separation by physical distance is more tolerable when ties to one's nation and friends are strong. Project Mercury, for example, will take advantage of this by maintaining voice communication between the man in orbit and his fellow astronauts on the ground.

b. Allowing an active role - When faced with danger, the worst thing is to be helpless. A man must be trained what to do in all forseeable situations and given the information necessary to solve unforseen problems.

c. Gratification of essential needs - Where disruption of usual patterns of behavior might impair efficiency,

substitution of other channels of gratification may be helpful. For example, crews confined for five days in a small capsule at the Aerospace Medical Laboratory ate over 5,000 calories daily, twice their metabolic requirements for this degree of activity.

d. Selection of crew members on the basis of:

(1) Motivation - This should not depend primarily on the need for personal accomplishment, but should arise from belief in the importance of the project and desire for its success.

(2) Intelligence - The crew member should not only have sufficient intellectual capacity to learn all phases of a complex mission, but also should have the problem-solving ability necessary to adapt to rapidly-changing circumstances.

(3) Low anxiety level - Since severe anxiety may disrupt functioning, careful screening must eliminate candidates likely to be incapacitated by anxiety under conditions expected in space.

(4) Freedom from neurosis - Crew members should be relatively free from neurotic symptoms. They should not be selected for psychopathology which appears "tailor made" for the demands of space flight. Neurosis is compatible with effectiveness in some situations, but not in others. Emotional conflict restricts the range of conditions to which an individual can adapt.

(5) Independence - Astronauts should not be overly dependent on others for satisfaction of their needs. At the same time, they must be comfortable when the nature of a mission requires them to depend on others for its success. They must tolerate close associations when necessary, but be able to withdraw when the occasion demands.

(6) Flexibility - Insofar as possible, astronauts must be able to function away from familiar surroundings, when usual patterns of behavior may be impossible.

(7) Freedom from impulsivity - A crew member must be able to act when action is appropriate, but must refrain from action when inactivity is appropriate.

II. More data are needed on:

A. Effects of multiple stressors - While many of the physiological and psychological stresses of space flight have been studied singly, little is known of their combined effects.

B. Unique effects of separation from earth - Laboratory experiments cannot simulate the psychological implications of leaving earth. The apprehensiveness felt by some people on water or in air may be common in those who don't even have anything to float on.

C. Techniques of adaptation to unusual environments - Most people depend on characteristic patterns of behavior appropriate for a familiar world. If removed from their accustomed matrix of customs and experiences, severe disorders may develop. Methods of adapting to novel surroundings have seldom been studied.

D. Interaction of isolation variables - Studies in the Aerospace Medical Laboratory have identified eight categories of variables which influence reactions to isolation. Control of some of these variables may minimize effects of others which cannot be controlled. The categories are:

1. Circumstances surrounding isolation - A prisoner of war would not respond exactly like an arctic explorer if both had the same physical surroundings.

2. Personality, motivation, and background of the subject - Some people enjoy isolation; others cannot tolerate more than a few hours.

3. Quantity, modality, and pattern of sensory input - Extreme reduction in number and variety of stimuli may produce hallucinations and other disorders of thought.

4. Enclosure or restraint - Confinement within a small area may cause both physiological and psychological disturbances.

5. "Aloneness" - The sense of "psychological" separation from other people.

6. Communication - Even the wires connected to a subject make him think he is in communication with other people, and thus reduce the feeling of "aloneness."

7. Time - The duration of isolation, the subject's knowledge of its duration, the degree of his control over duration, and the presence or absence of methods to measure time--all influence reactions to isolation

8. Activity - A job to do in isolation may make it more tolerable, but a dull job makes it more stressful than no job at all.

III. Studies of psychological aspects of space flight may yield benefits in the following areas:

A. Better understanding of the psychophysiological effects of stress - Investigation of both mental and physical reactions to the wide variety of stressors expected in space flight will provide better data on correlations between psychological and physiological variables. For example, studies of acceleration tolerance in the Aerospace Medical Laboratory showed that subjects who could ride to high "g" levels on the human centrifuge secreted greater quantities of nor-adrenaline and were more aggressive than low "g" subjects. This confirmed psychiatric hypotheses concerning the relationship of emotion and cardiovascular functions.

B. Personality studies - Isolation experiments arising from space medicine requirements have proven to be an excellent technique for studying personality. In a way, the isolation chamber is a "three-dimensional ink blot" to which each person responds according to his own dynamics. By first leading to an exaggeration of psychological defenses, then causing them to fail, isolation is a laboratory tool for study of processes important in mental illness.

C. Separation - Isolation experiments yield data on the effects of extreme separation of one individual from others--a crucial problem in human development.

D. Human needs - Studies of behavior in artificial surroundings improve our knowledge of what humans require from their environment. One of the best methods to investigate this is to place a man in a chamber which provides as little as possible, and then see which lacks disturb him and which do not.